

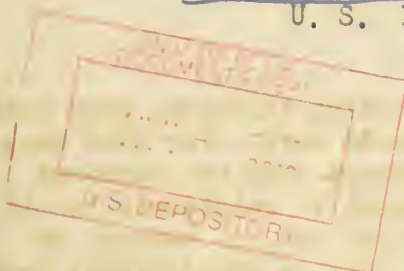
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## USE OF ENGELMANN SPRUCE FOR HOUSE CONSTRUCTION

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### Introduction

One of the principal uses of Engelmann spruce is for construction purposes. It is grouped with such woods as ponderosa pine, northern white pine, sugar pine, western redcedar, basswood, and balsam fir.

The properties desired in building material may be divided into two groups -- one containing those properties that tend to insure satisfactory service when the wood is in place, the other containing those properties that tend to facilitate construction and thus reduce cost. Strength, stiffness, nail-holding power, and stability are important properties in the first group. Light weight, softness, and ease of working are those of the second group. A species cannot excel in the properties of both groups, since, for instance if it has high strength, it is comparatively heavy and hard.

Engelmann spruce would be classed with the species that are light in weight and are easy to work, while such woods as Douglas-fir and southern yellow pine excel in strength and stiffness. Engelmann spruce ranks relatively high in freedom from warping and in paint-holding ability. It is classified as a low-shrinkage wood and at identical moisture content behaves about the same as ponderosa pine. Its resistance to decay is relatively low, and it has a relatively small amount of heartwood. The wood of Engelmann spruce is generally straight-grained and can be readily air dried. In paint-holding properties Engelmann spruce is classed with ponderosa pine and western hemlock -- below the white pines, cedars, redwood, and cypress, and above Douglas-fir and southern yellow pine.

### Uses in House Construction

While Engelmann spruce can be used for many parts of a house, it is probably used most extensively in the form of dimension and common boards.

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<sup>1</sup>Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

## Exterior Trim

The usual requirements for exterior trim are medium decay resistance, good painting and weathering characteristics, easy working qualities, and maximum freedom from warp. Engelmann spruce would rate along with hemlocks, ponderosa pine, and white fir for exterior trim. It would not be the equal of such woods as cedars, cypress, and redwood.

## Framing

Framing should be high in stiffness, have good bending strength, good nail-holding power, hardness, and freedom from pronounced warp. For this use, dryness and size are sometimes more important factors than the inherent properties of the different woods. Engelmann spruce is relatively low in strength properties, but this deficiency in strength can, of course, be compensated for by using somewhat larger sizes. This is particularly true for such purposes as floor joists and roof rafters. The sizes of some items such as studding are largely fixed by common practice. American Lumber Standards sizes were established with a view to having the sizes adequate for the lighter weight and weaker species. Engelmann spruce could, therefore, be used in the same stud size as the heavier and stronger species. Any nailing deficiency could be compensated for by use of larger or more nails. Engelmann spruce would be grouped with such woods as northern white pine, sugar pine, and ponderosa pine.

## Interior Trim with Paint Finish

Material for interior trim should have a fine and uniform texture, hardness, absence of discoloring pitch, and freedom from warp and shrinkage. For this purpose, Engelmann spruce would be classed with such woods as redwood, the hemlocks, and white fir. It would not be the equal of the commercial white pines and birch, walnut, and yellow-poplar. The hardwoods are, of course, considerably more resistant to denting, and where this property is of importance, Engelmann spruce would not prove satisfactory.

## Roof Boards

Roof boards should have high stiffness, good nail-holding ability, small tendency to warp, and be easy to work. Roof boards, however, are one of the less exacting items in house construction and Engelmann spruce could often be used in lieu of the stronger and harder woods, such as the hemlocks, eastern spruces, and white fir. It might require somewhat more nailing to hold shingles than if the harder and denser species were used.

## Siding

Siding should have good painting characteristics, easy working qualities, and freedom from warp. Woods excelling for use as siding include cedars, cypress, the commercial white pines, and redwood. Engelmann spruce would



rank with ponderosa pine and western hemlocks for use as siding. It would be somewhat superior to such woods as Douglas-fir, western larch, and southern yellow pine.

### Wall Sheathing

Wall sheathing is not a very exacting use, although easy working, easy nailing, and moderate shrinkage are desirable properties. Many woods can be used for sheathing with satisfactory results, although some woods are less time-consuming to work than are others. Engelmann spruce would be rated along with the white firs, commercial pines, and hemlocks. Engelmann spruce sheathing contains smaller but more numerous knots, is lighter and can be sawed and nailed more easily than such woods as Douglas-fir and southern yellow pine.

### Shelving with Natural or High-class Paint Finish

Requirements for shelving include stiffness, good finishing qualities, and freedom from pitch and warp. Many woods are suitable for this use and Engelmann spruce would be included along with the commercial white pines and would be somewhat superior to Douglas-fir, hemlocks, western larch, and southern yellow pine.

### Subflooring

The requirements for subflooring are not exacting, but high stiffness, medium shrinkage and warp, and ease of working are desirable characteristics. Many woods are used for this purpose with satisfactory results. Engelmann spruce would be classed along with the commercial white pines, hemlocks, ponderosa pine, and white fir.

### Conclusions

While Engelmann spruce can be used for many construction purposes, the greatest outlet will probably be for such uses as studding, subflooring, roof boards, and wall sheathing.

